



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1456
Alexandria, Virginia 22313-1456
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10-015,237	12-13-2001	Uttam Shyamalindu Ghoshal	AUS920010314US1	6284

7590

05/23/2003

Duke W. Yee
Carstens, Yee & Cahoon, LLP
P.O. Box 802334
Dallas, TX 75380

EXAMINER

PITTMAN, ZIDIA T

ART UNIT

PAPER NUMBER

1725

DATE MAILED: 05/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/015,237

Examiner

Zidia Pittman

Applicant(s)

GHOSHAL, UTTAM
SHYAMALINDU

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-943)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Page No. 4
- 4) ☐ Interview Summary (PTO-413) Page No. 1
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other

Art Unit: 1725

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-5, 7-11, 13-16, 18, and 19 are rejected under 35 U.S.C. 103(a) as being obvious over Ghoshal et al (USPN 6,403,876) in view of Amano et al (USPN 5,864,087).

The applied reference has a common inventor ('876: Uttam Ghoshal) with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not

Art Unit: 1725

claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(I)(1) and § 706.02(I)(2).

Ghoshal et al teaches a method and system for forming a thermoelement for a thermoelectric cooler including forming a first substrate having a plurality of pointed tips covered by a metallic layer, portions of the metallic layer being covered by an insulating material, and other portions of the metallic layer being exposed, covering portions of the metallic layer that are exposed with a thermoelectric material overcoat (col. 5, l. 46-54, 58-62; Fig. 2), clamping a second substrate of thermoelectric material to the thermoelectric material overcoat (col. 11, l. 1-9), forming a substrate having a plurality of pointed tips separated by valleys (col. 8, l. 50-56; Fig. 2), coating the substrate with a layer of metal (col. 8, l. 57-59), coating the layer of metal with a layer of insulating material (col. 5, l. 58-62), filling the valleys with a sacrificial material (col. 8, l. 61-63), removing sacrificial and insulating material to expose the plurality of tips (Fig. 2), and mechanically aligning the second substrate to the pointed tips (Fig. 2) and the system for forming such. Ghoshal et al teaches a thermoelectric cooler including a first

Art Unit: 1725

substrate having a plurality of pointed tips, the apexes of the tips having a selectively deposited overcoat thermoelectric material, a second substrate of planar thermoelectric material (Fig. 2), and wherein the planar thermoelectric material comprises a super lattice material (col. 7, l. 6-12).

Ghoshal et al does not teach a method for forming a thermoelement including fusing a second substrate of thermoelectric material to the thermoelectric material overcoat, wherein fusing the second substrate of thermoelectric material to the pointed tips comprises melting the thermoelectric material overcoat by heating the first substrate, and wherein the first substrate is heated to approximately 550 degrees Celsius. Ghoshal et al does not teach a system for forming a thermoelement including means for fusing a second substrate of thermoelectric material to the thermoelectric material overcoat. Ghoshal et al does not teach a thermoelectric cooler including fused connections between the overcoat thermoelectric material and the planar thermoelectric material.

Amano et al teaches a thermoelectric device and that it is conventional to join the thermoelectric materials to the substrate by means of a fusing process. (col. 1, l. 11-18; col. 2, l. 64 – col. 3, l. 11; col. 4, l. 36-46)

With regards to the limitation requiring melting of the thermoelectric material overcoat, the examiner submits that it would be obvious that the thermoelectric material overcoat would melt when the fusion process occurs, as described by Amano et al.

Art Unit: 1725

With regards to the limitation requiring the first substrate is heated to approximately 550 degrees Celsius, the examiner submits that this limitation is material dependent.

With regards to the limitations requiring a system including wherein fusing the second substrate of thermoelectric material to the pointed tips comprises melting the thermoelectric material overcoat, wherein the thermoelectric material overcoat is melted by heating the first substrate, and wherein the first substrate is heated to approximately 555 degrees Celsius, it is the examiner's position that these limitations do not further limit the structural aspects of the apparatus. Furthermore, the reference need only teach the structural limitations of the apparatus with those limitations capable of performing the functions indicated. Amano et al teaches the structural limitations required by the claims as indicated above.

Both Ghoshal et al and Amano et al relate to thermoelectric devices. (see Ghoshal et al: abstract; Amano et al: abstract)

At the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the teachings of Ghoshal et al with the teachings of Amano et al in order to provide exceptionally good results when connecting thermoelectric materials to a substrate when producing a thermoelectric device.

Claims 1-5, 7-11, 13-16, 18, and 19 are rejected under 35 U.S.C. 103(a) as being obvious over Ghoshal et al (USPN 6,384,312) in view of Amano et al (USPN 5,864,087).

Art Unit: 1725

The applied reference has a common inventor ('312: Uttam Ghoshal) with the instant application (see above).

Ghoshal et al teaches a method and system for forming a thermoelement for a thermoelectric cooler including forming a first substrate having a plurality of pointed tips covered by a metallic layer, portions of the metallic layer being covered by an insulating material, and other portions of the metallic layer being exposed, covering portions of the metallic layer that are exposed with a thermoelectric material overcoat (col. 5, l. 58 – col. 6, l. 10; Fig. 2), clamping a second substrate of thermoelectric material to the thermoelectric material overcoat (col. 11, l. 10-19), forming a substrate having a plurality of pointed tips separated by valleys (col. 8, l. 60 – col. 9, l. 16; Fig. 2), coating the substrate with a layer of metal (col. 9, l. 1-3), coating the layer of metal with a layer of insulating material (col. 6, l. 3-5), filling the valleys with a sacrificial material (col. 9, l. 5-7), removing sacrificial and insulating material to expose the plurality of tips (Fig. 2), and mechanically aligning the second substrate to the pointed tips (Fig. 2) and the system for forming such. Ghoshal et al teaches a thermoelectric cooler including a first substrate having a plurality of pointed tips, the apexes of the tips having a selectively deposited overcoat thermoelectric material, a second substrate of planar thermoelectric material (Fig. 2), and wherein the planar thermoelectric material comprises a super lattice material (col. 7, l. 17-23).

Ghoshal et al does not teach a method for forming a thermoelement including fusing a second substrate of thermoelectric material to the thermoelectric material overcoat, wherein fusing the second substrate of thermoelectric material to the pointed

Art Unit: 1725

tips comprises melting the thermoelectric material overcoat by heating the first substrate, and wherein the first substrate is heated to approximately 550 degrees Celsius. Ghoshal et al does not teach a system for forming a thermoelement including means for fusing a second substrate of thermoelectric material to the thermoelectric material overcoat. Ghoshal et al does not teach a thermoelectric cooler including fused connections between the overcoat thermoelectric material and the planar thermoelectric material.

Amano et al teaches a thermoelectric device and that it is conventional to join the thermoelectric materials to the substrate by means of a fusing process. (col. 1, l. 11-18; col. 2, l. 64 – col. 3, l. 11; col. 4, l. 36-46)

With regards to the limitation requiring melting of the thermoelectric material overcoat, the examiner submits that it would be obvious that the thermoelectric material overcoat would melt when the fusion process occurs, as described by Amano et al.

With regards to the limitation requiring the first substrate is heated to approximately 550 degrees Celsius, the examiner submits that this limitation is material dependent.

With regards to the limitations requiring a system including wherein fusing the second substrate of thermoelectric material to the pointed tips comprises melting the thermoelectric material overcoat, wherein the thermoelectric material overcoat is melted by heating the first substrate, and wherein the first substrate is heated to approximately 555 degrees Celsius, it is the examiner's position that these limitations do not further limit the structural aspects of the apparatus. Furthermore, the reference need only

Art Unit: 1725

teach the structural limitations of the apparatus with those limitations capable of performing the functions indicated. Amano et al teaches the structural limitations required by the claims as indicated above.

Both Ghoshal et al and Amano et al relate to thermoelectric devices. (see Ghoshal et al: abstract; Amano et al: abstract)

At the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the teachings of Ghoshal et al with the teachings of Amano et al in order to provide exceptionally good results when connecting thermoelectric materials to a substrate when producing a thermoelectric device.

Claims 6, 12, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghoshal et al (USPN 6,403,876/USPN 6,384,312) in view of Amano et al (USPN 5,864,087) as applied to claims 3, 9, and 14 above, and further in view of Lemelson (USPN 3,779,446).

Ghoshal et al in view of Amano et al teaches all the limitations of claims 6, 12, and 17 as stated above for claims 3, 9, and 14, except for teaching passing a current through the tips in order to induce Joule heating of the thermoelectric material overcoat.

Lemelson teaches resistance welding of abutted materials in the production of thermoelectric elements (col. 8, l. 61 – col. 9, l. 56).

Both Ghoshal et al in view of Amano et al and Lemelson disclose applications involving thermoelement devices. (see Ghoshal et al: abstract; Amano et al: abstract ; Lemelson: col. 9, l. 25-40)

Art Unit: 1725

At the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the teachings of Ghoshal et al in view of Amano et al with the teachings of Lemelson as a conventional process of fusing thermoelectric materials.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ghoshal et al (USPN 6,494,048), Ghoshal (USPN 6,474,074), Ghoshal (USPN 6,467,951), Ghoshal (USPN 6,467,275), Nolas (USPN 6,369,314), Kadotani et al (USPN 6,347,521), Ghoshal (USPN 6,222,113), Tocher et al (USPN 5,651,495), Alais et al (USPN 3,958,324), Miller (USPN 3,879,838), Seetoo et al (USPN 3,808,670), Ghoshal et al (US Patent Publication 2002/0166839 A1), Ghoshal et al (US Patent Publication 2002/0092557 A1), and Dresselhaus et al (*Low-dimensional thermoelectric materials*) are cited as of interest.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zidia Pittman whose telephone number is (703) 305-1248. The examiner can normally be reached on Monday – Thursday and alternate Fridays from 8:30 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn, can be reached at (703) 308-3318. The official fax phone number for the organization where this application or proceeding is assigned is (703) 305-7718. The unofficial fax number for art unit 1725 is (703) 305-6078.

Application/Control Number: 10/015,237

Page 10

Art Unit: 1725

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

37P

3/12/03



TOM DUNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700